

# Andrew Carney Goering

## Research Interests

Air-Sea Interactions, Submesoscale Dynamics, Surface Gravity Waves, Remote Sensing.

## Education

- 2024–PRESENT | **Ph.D. Student in Physical Oceanography**, University of Rhode Island Graduate School of Oceanography (Advisor: Nick Pizzo).
- 2019–2024 | **BSc. in Mechanical Engineering** - summa cum laude, Northeastern University
- 2019–2024 | **Minor in Mathematics**, Northeastern University.
- 2019–2024 | **Minor in Robotics**, Northeastern University.

## Work and Research Experience

- 2024 | **Graduate Student, Surface Processes Lab, Graduate School of Oceanography, University of Rhode Island**  
My research aims to understand the directional kinematics and geometry of the surface wave field and how interactions between surface waves, winds, and currents impact the larger earth system using theoretical, laboratory, and field studies.
- 2023–2024 | **Mechanical Lab Tech - Woods Hole Oceanographic Institution, Woods Hole, MA**  
Performed mechanical design and analysis of updated modular hull and internal components for a 100 meter-rated REMUS autonomous underwater vehicle (AUV), as part of the Phoenix initiative. Derived a mathematical model and completed mechanical design and testing for the pressure compensator system for the oil-filled thruster on the ONR-funded 3000 meter-rated REMUS AUV, accounting for the behavior of air bubbles. Designed and performed structural analysis on mission-critical internal components. Supported marine operations, testing, and maintenance for 100, 600, and 3000 meter-rated AUVs to ensure safe, timely, and successful deployments for naval and scientific applications. Designed, built, and tested a prototype REMUS 600 AUV docking system that uses inductive pucks to enable charging and data transfer for long-duration under-ice deployments for the ONR-funded AMOS program.
- 2022–2024 | **Undergraduate Researcher - Multiphase Transport Lab, Northeastern University, Boston, MA**  
As a founding member of the viscous fingering instability group, conducted a literature review and identified promising areas of research. Designed and validated a low-cost radial Hele-Shaw cell apparatus for viscous fingering instability experiments. Ran more than 100 experiments to characterize the influence of a novel gelation reaction and a shear-thinning Carreau-Yasuda fluid on the fingering instability. Analyzed data using linear stability analysis to ascertain the driving physics for diverse finger morphologies. Advisor: Xiaoyu Tang

- 2022 | **R&D Co-op - Verve Motion, Cambridge, MA**  
Designed and tested an experimental robotic exoskeleton to optimize for comfort and assistive moment about the hips and lumbar spine. Developed and administered high temperature load cell noise and drift experiments and automated statistical analysis of the results.
- 2021–2022 | **R&D Co-op - Mesodyne, Somerville, MA**  
Designed and manufactured vacuum packages and designed burner control systems for light-cell energy conversion device prototypes. Designed data acquisition PCBs and wrote logging software to conduct experiments for characterizing photovoltaic cells.

## Project Work

- 2023–2024 | **Senior Design Project: Uncrewed Sailing Vessel** - Modeled, designed, and built a low-cost, two-person portable autonomous surface vessel powered by a self-trimming rigid wing. Developed a workflow to optimize wing geometry for maximum propulsive force, given hull properties. Successfully sailed the vessel on the Charles River Basin prior to delivery to the Massachusetts Maritime Academy for further development. Advisor: Michael Allshouse.
- 2019–2024 | **Rocket Design, Modeling and Construction** - Developed rocket stability model to predict heading oscillation growth rate based on coefficients of lift, drag and moment derived from CFD simulations for varying angles of attack. Designed and tested parachute deployment and reefing mechanisms to achieve safe, controlled descent of a liquid bipropellant rocket. Developed Marman clamp mechanism for rocket separation and documented mathematical methods used to evaluate the loading of the constituent components. Tested prototypes in-flight and performed FEA to minimize mass and volume. Built a car-mounted parachute testing apparatus and used it to evaluate the performance and drag coefficients of reefed parachutes. Designed and implemented an instrumented nose cone assembly with load cells and pitot tube for drag data acquisition on a test vehicle. Constructed and successfully flew a 7' rocket for mechatronic systems testing and National Association of Rocketry Level 2 Certification.

## Volunteer Work

- 2024 | **Science Saturday Outreach Program** - Demonstrated principles of hydrodynamics and ocean acoustics to the public and engaged with children through hands-on activities at the URI Graduate School of Oceanography.
- 2024 | **Ocean Vector Winds Science Team Early Career Steering Committee**
- 2022–2023 | **Lab Manager for Aerospace Club** - provided lab safety and equipment training on a daily basis and maintained machines and equipment for the AerospaceNU club at Northeastern University.
- 2020 | **Face Shield Manufacturing** - Organized a group of 10 students to 3D print nearly 1000 face shield frames for use at healthcare facilities across the Northeast during the onset of the COVID-19 pandemic.
- 2019 | **The Clubhouse Makerspace** - Worked with Roxbury, MA youth on self-directed artistic, musical, and engineering projects as part of a college mentoring program.

## Fellowships and Awards

- |           |   |
|-----------|---|
| 2024      | <b>Greenlee Fellowship – University of Rhode Island Graduate School of Oceanography</b><br>Award established to enable URI-GSO to compete for the highest quality students. |
| 2022–2024 | <b>James W. Healy Full Tuition Scholarship – Northeastern University</b><br>Awarded to outstanding undergraduate students in Northeastern’s College of Engineering.         |

## Technical Skills

APPLICATIONS	SolidWorks, Ansys Fluent, Onshape, KiCAD, PrusaSlicer, Arduino IDE, Eclipse IDE. Some experience with Mathematica, Maple, Autodesk AutoCAD, Inventor, HSM Works and Fusion 360
PROGRAMMING	MATLAB, Python, ROS, Java, some experience with C++ and HTML/CSS.
MANUFACTURING	FDM and SLA 3D printing, laser cutting, soldering, manual mill, lathe, water-jet cutter, composite lay-ups, PCB design.
MARINE OPS	Experience deploying and testing autonomous underwater and surface vehicles from small boats up to 60 ft. Skilled dinghy sailor.

## Conference Presentations

- |      |   |
|------|---|
| 2023 | Andrew Goering, Evan Dakov, and Xiaoyu Tang. Diverse fingering morphologies driven by shear-thinning effects. In <i>American Physical Society - Division of Fluid Dynamics Annual Meeting</i> , November 2023 |
|------|---|